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OBSERVATIONAL ANALYSIS OF THE EFFECTS OF MUSIC ON A CHILD WITH
PERVASIVE DEVELOPMENTAL DISORDER

Donovon Thakur

HONORS PROJECT

Submitted to the University Honors Program
at Bowling Green State University in partial
fulfillment of the requirements for graduation with

UNIVERSITY HONORS

May 1st, 2012

Dr. Elaine Colprit, Music Education

David Putano, MT-BC, Music Therapy

Abstract:

For this project, I conducted twelve music sessions with a 3-year old child diagnosed with Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS). The majority of the sessions were exploratory in nature, seeking to illuminate upon specific questions regarding attention span, client interaction, and speech development. Music sessions were video-recorded and analyzed using *Scribe 4.0.6.*, which allows the user to code video into various segments, each corresponding to specific behaviors/events. The session data analysis reveals a lack of consistent trends in behavior, many of which are attributable to the subject's age. Observational data identifies various areas of improvement in client routine and interaction.

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Background

According to AutismSpeaks.org, Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS) is one of the autism spectrum disorders used to describe individuals who do not fully meet the criteria for Autistic Disorder or Asperger syndrome. They alternately label it as a type of “sub-threshold autism.” Those diagnosed with PDD-NOS exhibit a varied set of atypical symptomatology, often including: a lack of social interaction and social reciprocation abilities, mild cognitive impairment, mild language delay, or repetitive behaviors. These symptoms may exist in some key areas but not others, or may exist at such a mild level where either case is not enough to fully meet the criteria for Autistic disorder.

I believe that everyone can be reached through music. To me, this is a central tenet of using music in a therapeutic setting. Music therapy is defined by the American Music Therapy Association (2011) as: “the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program.” It has also been described as the use of music to accomplish non-musical goals. It is very important to note that the interactions within my project are not to be considered music therapy. A music therapy session requires, by definition, the presence of a credentialed professional, which I am not. However, this does not mean that the interactions will not have any benefit.

Music therapy as modality of intervention has become increasingly popular in the treatment of Autism-spectrum disorders. Many music therapists design interventions for Autistic individuals with goals to address improving communication/language skills as well as improving socio-behavioral skills.

Method/Procedure

Subject

This project follows a case study method centered around a single child. Jackson is three years old and was diagnosed in June 2011 with PDD-NOS at Henry Ford Medical Center, Detroit MI. He is the youngest of three children. Jackson attends school at Capable Kids and has recently increased his attendance to five times a week. While at school, he also attends Applied Behavior Analysis (ABA) therapy. In addition to schooling, he also attends speech therapy at Rehab Dynamics.

Recruitment

Subject was referred to me through my family and a mutual contact. After being put in contact with the subject's parents, as a way to benefit both parties and to avoid compensation, I proposed that we make my interactions with Jackson centered around my proposed project.

Sessions

Music sessions were scheduled to be twice a week for a total of twelve sessions, however due to illness and prior obligations on both sides, this schedule was altered as needed. For a full list of session information, see Appendix C. The majority of sessions were conducted at Sunshine Children's Home prior to Jackson's swimming lessons. The remainder of the sessions were conducted at the Wolf Creek YMCA. Jackson's mother was present and actively involved with each session, providing all of the physical interactions and often serving as the gentle reminder that pulled Jackson back to the music. Jackson's sister Kali was also present, though not involved, at a majority of sessions at Sunshine Children's home.

Activities

Sessions (excluding session 1) began and ended with an adaptation of “Lean on Me,” formatted as a “Hello Song,” to begin the session, and a “Goodbye Song,” to end the session (for a full adaptation, see Appendix F). Other activities included various songs such as: “ABC’s”; “Twinkle Twinkle Little Star”; “Apples and Bananas”; “Little Green Frog”; “Head, Shoulders, Knees & Toes”; “The Wheels on the Bus”; “If You’re Happy and You Know It”; and a few others. Many of these songs were accompanied by physical gestures and routines, often guided hand-over-hand by Jackson’s mother. Each session also included time for Jackson to explore the guitar, the room, and any other instruments present such as resonator bells, shaker egg, and various percussion instruments (Session 6).

Video Recording and Analysis

All music sessions were filmed using a Flip UltraHD camcorder and analyzed using *Scribe 4.0.6* (Duke R.A., & Stammen D.). Scribe allows the user to code video into various segments, each corresponding to specific behaviors and events. This process allows for flexible playback options by category and a summary of behavior/event timings. For complete session summaries, see Appendix A.

Codes

The following codes were used in the video analysis:

Subject: Jackson

-Vocalization: any vocal activity, excluding non-tonal mouth sounds, which do not fall under “vocalization-laughing” and “vocalization- crying distressed.”

-Vocalization- Laughing: all laughing vocal activity.

-Vocalization- Crying/Distressed: all crying and all vocal activity that suggested distress.

-Away: time spent away from the music during a session, i.e. physically distanced from both Mother and Myself, unengaged by music activity. Duration ends when he is either re-engaged or no longer engaged with the distraction.

-Engaged: attention is focused on a specific object or event (the music, the guitar, listening, etc). Most commonly accompanied by eye contact or a maintained state of awareness. Not distracted.

-Engaged/Playing: attention is focused on physically creating sound/music, most commonly with my guitar. Also with resonator bells, shaker egg, and various percussion instruments (Session 6).

Subject: Myself

-Speaking: speech directed either specifically toward Jackson or toward both Jackson and Mother. Does not include dialogue between Mother and Myself.

-Singing: Singing, unaccompanied by guitar.

-Playing: Playing guitar without speaking or singing. Does not include playing intermittently or sparsely in response to Jackson's actions.

-Speaking & Playing: speaking similar to "speaking," while playing the guitar.

-Singing & Playing: Singing, accompanied by guitar.

Subject: Mother

-Speaking: speech directed either specifically toward Jackson or toward both Jackson and Myself. Does not include dialogue between Mother and Myself.

Results

Video Analysis Data

Using compiled data from the session summaries in Appendix A, aggregate data charts were created to reflect changes in various behavioral statistics across all sessions (see Appendix B: Aggregate Behavior Video Analysis Charts). Table 1 shows the percentage of time devoted to each behavior, organized by session. Overall, results are highly variable, showing peaks both up and down at various points in the session history. Table 1 does show that the combined “engaged” and “engaged/playing” behavior remains at an average of 40-50%, showing a consistent basis for Jackson’s attention to be held by music. A notable result also occurs in session twelve, where Jackson did not leave the music or exhibit any sort of crying/distressed vocalizations for the entire session.

The more consistent trends throughout the sessions deal mostly with my activity. There is a nearly consistent decrease in my playing while not singing or speaking and a nearly consistent increase in the amount of time spent playing and singing.

With regard to speech, looking at the timelines in Appendix A, there is also a consistent trend in that the frequency (i.e. rate/minute) of vocalizations usually increases during the second half of the session.

Table 2 in Appendix B shows the mean behavior time for each behavior followed by the standard deviation for each behavior, organized by session. Looking specifically at the mean behavior times for “engaged” and “engaged/playing,” we begin to see a change as Jackson’s attention is shifted more from “engaged” to “engaged/playing.” Attempts were made to identify any trends in overall attention span length, however Table 2 also reveals that any peaks in “engaged” or “engaged/playing” behaviors are also accompanied by high standard deviations.

Another aspect of *Scribe 4.0.6*, aside from the numerical output features, is the flexible playback options it allows for. Using this feature, the user can either compile a sequence of events to play in order or choose a specific behavior and simply watch all instances of the specific behavior in order. This feature provided the most insight when looking at the vocalizations. Since the vocalizations usually lasted from one to three seconds, multiple times over the entire span of a 17-24 min session, hearing them all played consecutively helped to reveal any patterns in his speech. Common vowel sounds could be identified (and were even used in the creation of variations on the “Little Frog” song, substituting “mmm ahh” [went the little green frog one day] with sounds like “eee ahh” or “ooo weh”) throughout the various sessions.

Variability

As may have been expected with a three-year-old child, the results of the analysis data are highly variable. There are definite peaks throughout our sessions, however it is hard to determine a consistent trend in behaviors. A likely reason for this is that many of Jackson’s behaviors depended on his general demeanor that day. Some days he came into a session highly energetic and only wanted to explore the room. Other days he seemed quite content just listening to the music and not actually participating very much.

Another trend that may be drawn for the variability of results may be linked to the frequency of sessions. Sessions 2-7 and 8-10 were done at a rate of twice a week, whereas sessions 10-12 were at a rate of once a week. This may explain the decrease in mean behavior time for “engaged” and “engaged/playing” over the final few sessions.

Another reason for the lack of a consistent trend may have been due to the difficulty with which each session was coded. I attempted to, as objectively as possible, code for each behavior.

However, it was difficult to draw the line of when exactly Jackson became engaged or disengaged from a particular task due to the fact that there was not a prescribed standard for which actions his attention was supposed to be fixated upon.

Observational Results

Jackson's general behavior varied session to session. Overall, Jackson was highly interested in the guitar. At the beginning of every session, he would come to explore the guitar as I was getting it out of the case and before I could even begin the "Hello Song." He would strum the guitar down with all of his fingers and rest his fingers on the top string so he could strum each string up with his thumb. He would play the strings on the floating bridge, on the headstock, the little pieces of extra string on the headstock knobs and run his fingers and nails along the strings. He would look in to the sound holes of the guitar. Jackson was fascinated with the volume/tone knobs and would turn them back and forth multiple times. While I played the guitar, he would also often watch one of my hands as they played.

Aside from the guitar, Jackson was usually interested in my voice, especially when I was singing, and even more especially when I started singing. Jackson's attention was also always drawn to any sort of mouth sounds such as whistling, clucking, and lip smacking. He would usually place his hands on mother's or my mouth in an attempt to figure out where the sounds came from.

Like any child, Jackson is an explorer. Indeed, much of time in the sessions was devoted to exploring the guitar and the surroundings. As sessions continued, however, there are noticeable developments in his behavior that cannot be reflected in the video analysis data. Perhaps the most consistent of these developments is Jackson's learning of the session routine. At the end of many of the sessions, during the Goodbye Song, Jackson would get up and lead his

mother to be ready to leave. As we abandoned the resonator bells and other percussion instruments to focus on the guitar, noticeable improvements were made with respect to his understanding of the guitar. Starting at session nine, Jackson began to grab my hand (still holding a pick) and use it to strum the guitar. Around this same time, Jackson began using my pick at times to strum the guitar, recognizing the use for the pick. During session ten, after I repeated multiple trills (i.e. rapid hammer-ons and pull-offs) with my left hand, Jackson would grab my fingers and force them through the same motions on the fretboard. Also, as we continued to repeat songs such as “Head, Shoulders, Knees & Toes” and “If You’re Happy and You Know It,” although he rarely initiated the movements, it is visible that he is waiting and anticipating the next movements that he will go through with mom.

During session twelve, Jackson made noticeable improvements in language. During the session, Jackson used sounds like “Bo,” “Go,” “No,” “Hi,” and “Yea,” none of which were used prior to that session.

Discussion

My original research questions were:

-1) How does a child with PDD respond to music?

Looking at the observational results, it is evident that this specific child highly responds to music. It was known prior to the start of the project that Jackson may already have certain inclinations toward music. His father plays guitar so he had already been introduced to the instrument. Yet, it is still important to note that the music and the guitar continued to hold his attention after twelve sessions.

Around sessions 7-8, the decision was made to shift away from any resonator bell activity, to focus more on the songs and the guitar. At the same time, we began to see a transition

of musical instruments from being objects that need exploring to an actual source of music and musical activity. Here Jackson began to play with the guitar beyond exploring the types of sounds and textures it produces. Aside from the numerical data provided by this study, for a child as young as Jackson, it is shifts like this and the learning of routine that are the real benefits of this study.

-2) How does music affect the attention span of a child with PDD?

Although there is no directly identifiable numerical trend in Jackson's attention span, it still remains that the music continues to hold his attention even after twelve sessions. Although the data may show that there are no trends in an increase or decrease of attention span length, through the observational data it is evident that when music is present it continually steals his attention.

We see in the very first session one of the peaks in Jackson's percent of time spent "engaged" and "engaged/playing." A possible explanation for this is that this was the first time Jackson had come in contact with the particular room, our new routine, and myself. This may also explain why the first session also has the highest peak in vocalization-crying/distressed (Table 1, Appendix B). Throughout the rest of the sessions, the shift in attention from "engaged" to "engaged/playing" shows that, although Jackson may have a limited amount of attention, his overall attention is increasingly taken by music.

-3) When words are set to music, what effect does music have on the speech of a child with PDD?

Looking at the sudden developments in speech during session twelve and the trend to increase vocal activity during the latter half of each session, although the music sessions are not likely the only cause of the speech developments, they surely provide a supporting role for Jackson's continued speech development.

Many of the variations in behavior and the changes in behavior may also be explained by the fact that Jackson is a three-year-old child. Many of his behaviors need not be explained in terms of PDD-NOS or Autism since many of them are typical of young children in general. So too may any of the improvements in behavior be attributed to his schooling, therapies, and home environment. The music sessions themselves are likely not the sole reason for any improvements in behavior.

It seems safe to say that further sessions and analysis would continue to provide new observations and may perhaps shed more light on the above research questions. Perhaps this is a way to continue to reveal new answers to these questions.

Reflection:

Since Jackson was non-verbal, constructing activities with him proved to be really difficult because it was impractical to assign him specific tasks. This also became an issue in providing meaningful measures of any improvements in attention span, ability to take turns, or speech. This entire project has been an immense learning experience for all parties involved. Personally, I was constantly thrown into situations that I could in no way prepare for and quickly learned that flexibility is surely an essential trait for this type of work. Reviewing the sessions and looking back, there are many things I would change or attempt to improve upon to make our time together more beneficial. For example, seeing how Jackson was drawn to my voice whether I was speaking or singing, I would have liked to have started the trend of increasingly playing and singing more every session earlier in our work together. I would have also liked to speak more in every session, however this role was often taken by Jackson's mother. If our work together were to continue, it would be interesting to see how Jackson would handle a session without Mother present, or at least not interacting.

Much like Jackson would explore the new environments, instruments, and activities, so too was the primary goal of this project designed to explore the effects of music on his behavior. In that much I feel we found a measure of success. Yet, above all this project helped to put into action the power of music that words can hardly describe.

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Appendix A:
Scribe Output Summaries & Timelines

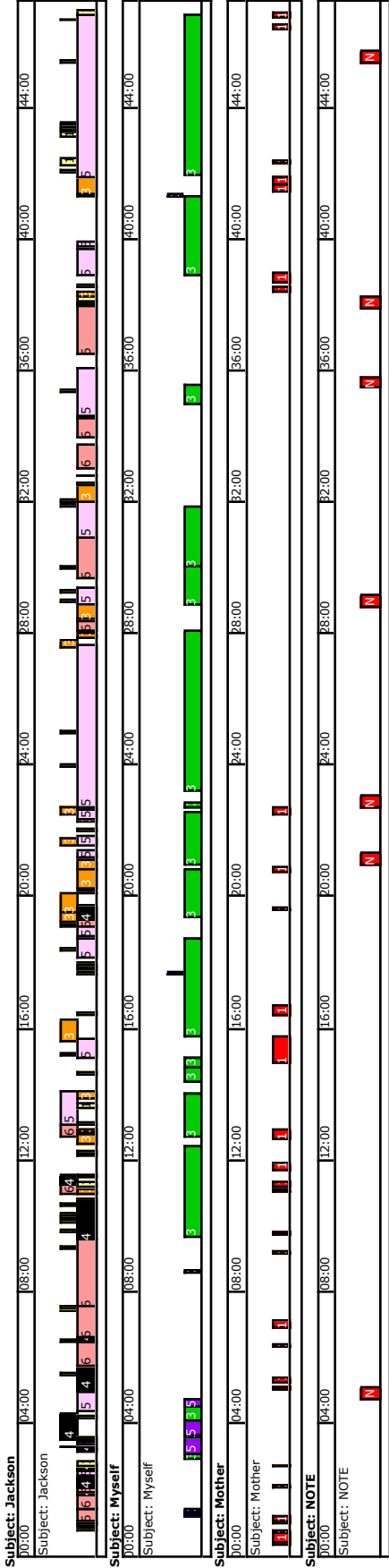
File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 1.htm
Date: Thu Apr 26 2012 14:16:52 GMT-0400 (EDT)

Total Observation Time: 46:56

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	52	1.108	02:44.7	5.850	00:03.1	1.97
Jackson	Vocalization- Laughing	2	0.04260	00:02.9	0.1041	00:01.4	0.30
Jackson	Vocalization- Crying/Distressed	20	0.4260	05:19.8	11.35	00:15.9	11.02
Jackson	Away	12	0.2556	04:06.9	8.767	00:20.5	20.05
Jackson	Engaged	20	0.4260	17:54.0	38.13	00:53.7	83.52
Jackson	Engaged/Playing	16	0.3408	09:51.9	21.02	00:36.9	32.73
Myself	Speaking	5	0.1065	00:08.0	0.2850	00:01.6	0.80
Myself	Singing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Playing	17	0.3621	27:09.0	57.84	01:35.8	88.80
Myself	Speaking & Playing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Singing & Playing	3	0.06391	01:06.9	2.378	00:22.3	6.05
Mother	Speaking	29	0.6178	04:12.5	8.966	00:08.7	8.49

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
04:46.2	Attention- Done Playing
21:00.5	Plug Ears
22:45.2	instantly calm
28:52.2	Brought back by mom playing bell
35:29.3	Plug Ears
37:57.9	Moves mom's hand back around him
45:24.4	Match Pitch



File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 2.htm
Date: Thu Apr 26 2012 14:21:21 GMT-0400 (EDT)

Total Observation Time: 23:26

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	21	0.8958	01:16.4	5.437	00:03.6	2.05
Jackson	Vocalization- Laughing	7	0.2986	00:16.3	1.164	00:02.3	0.86
Jackson	Vocalization- Crying/Distressed	9	0.3839	00:49.5	3.522	00:05.5	4.40
Jackson	Away	19	0.8105	03:32.3	15.10	00:11.1	8.72
Jackson	Engaged	18	0.7678	08:20.5	35.58	00:27.8	15.49
Jackson	Engaged/Playing	4	0.1706	01:40.4	7.144	00:25.1	13.01
Donovon	Speaking	10	0.4266	04:06.0	17.49	00:24.6	15.42
Donovon	Singing	0	0.000	00:00.0	0.000	00:00.0	0.00
Donovon	Playing	8	0.3413	06:05.4	25.98	00:45.6	41.34
Donovon	Speaking & Playing	2	0.08531	01:18.0	5.546	00:39.0	19.39
Donovon	Singing & Playing	3	0.1280	04:09.2	17.72	01:23.0	11.89
Mother	Speaking	23	0.9811	05:31.3	23.56	00:14.4	13.40

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
05:50.2	Two bells sil.
13:16.1	Grabs Egg
15:46.4	Leads mom by hand
19:16.5	ee-a, ee-a
20:33.8	ooo-weh, ooo-weh
21:59.6	Initiates Swaying

Subject: Jackson											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Jackson											
5	5	4	5	6	5	4	5	5	4	5	5
5	5	4	5	6	5	4	5	5	4	5	5
Subject: Donovan											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Donovan											
5	5	4	5	6	5	4	5	5	4	5	5
5	5	4	5	6	5	4	5	5	4	5	5
Subject: NOTE											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: NOTE											
Subject: Mother											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Mother											
1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1





File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 3.htm
Date: Thu Apr 26 2012 14:23:08 GMT-0400 (EDT)

Total Observation Time: 24:37

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	48	1.949	02:39.7	10.81	00:03.3	2.81
Jackson	Vocalization- Laughing	23	0.9341	01:10.1	4.745	00:03.0	1.97
Jackson	Vocalization- Crying/Distressed	22	0.8935	01:58.4	8.020	00:05.3	3.86
Jackson	Away	14	0.5686	07:48.5	31.71	00:33.4	29.27
Jackson	Engaged	22	0.8935	10:23.8	42.22	00:28.3	31.39
Jackson	Engaged/Playing	6	0.2437	01:20.9	5.476	00:13.4	4.78
Myself	Speaking	14	0.5686	00:38.1	2.584	00:02.7	1.51
Myself	Singing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Playing	9	0.3655	05:00.0	20.31	00:33.3	14.59
Myself	Speaking & Playing	2	0.08123	02:02.5	8.298	01:01.2	52.33
Myself	Singing & Playing	9	0.3655	05:07.9	20.85	00:34.2	12.80
Mother	Speaking	55	2.234	07:23.9	30.05	00:08.0	9.58

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
01:49.8	Comes back on own
01:54.5	Strums 4 chords of Hello song
04:16.0	Excited by music, returns on own
09:47.7	Mmmaa
18:02.7	multiple syllables
20:38.6	Comes back on own
20:59.7	Good Listening!
23:18.7	Waiting for guitar to play, anticipated

Subject: Jackson											
00:00	01:59	03:59	05:59	07:59	09:59	11:59	13:59	15:59	17:59	19:59	21:59
Subject: Jackson											
											
Subject: Myself											
00:00	01:59	03:59	05:59	07:59	09:59	11:59	13:59	15:59	17:59	19:59	21:59
Subject: Myself											
											
Subject: Mother											
00:00	01:59	03:59	05:59	07:59	09:59	11:59	13:59	15:59	17:59	19:59	21:59
Subject: Mother											
											
Subject: NOTE											
00:00	01:59	03:59	05:59	07:59	09:59	11:59	13:59	15:59	17:59	19:59	21:59
Subject: NOTE											
											

File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 6.htm
Date: Thu Apr 26 2012 14:24:17 GMT-0400 (EDT)

Total Observation Time: 23:27

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	22	0.9376	01:17.7	5.524	00:03.5	2.95
Jackson	Vocalization- Laughing	11	0.4688	00:33.6	2.393	00:03.0	2.28
Jackson	Vocalization- Crying/Distressed	5	0.2131	00:44.9	3.195	00:08.9	8.15
Jackson	Away	11	0.4688	01:07.9	4.824	00:06.1	4.81
Jackson	Engaged	21	0.8950	07:27.2	31.77	00:21.2	11.88
Jackson	Engaged/Playing	3	0.1279	01:39.9	7.097	00:33.3	17.62
Myself	Speaking	19	0.8098	01:04.4	4.578	00:03.3	2.54
Myself	Singing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Playing	6	0.2557	03:23.4	14.45	00:33.9	22.51
Myself	Speaking & Playing	1	0.04262	00:21.0	1.492	00:21.0	0.00
Myself	Singing & Playing	4	0.1705	04:29.1	19.12	01:07.2	9.62
Mother	Speaking	60	2.557	07:23.0	31.47	00:07.3	14.36

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
03:12.9	Learns to turn rain stick over
04:48.4	Uses pick to strum guitar
21:42.3	Putting instruments in the basket

Subject: Jackson											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Jackson											
5	5	5	5	6	5	5	5	5	5	5	5
Subject: Myself											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Myself											
3	5	4	3	1	1	3	5	3	3	1	1
Subject: Mother											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: Mother											
1	1	1	1	1	1	1	1	1	1	1	1
Subject: NOTE											
00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Subject: NOTE											
N N N											

File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 8.htm
Date: Thu Apr 26 2012 14:26:13 GMT-0400 (EDT)

Total Observation Time: 16:46

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	31	1.847	01:42.9	10.22	00:03.3	2.59
Jackson	Vocalization- Laughing	0	0.000	00:00.0	0.000	00:00.0	0.00
Jackson	Vocalization- Crying/Distressed	2	0.1192	00:45.7	4.541	00:22.8	18.32
Jackson	Away	5	0.2979	01:39.6	9.898	00:19.9	9.66
Jackson	Engaged	10	0.5959	03:54.0	23.25	00:23.4	17.78
Jackson	Engaged/Playing	6	0.3575	04:28.8	26.70	00:44.8	28.80
Myself	Speaking	23	1.371	01:06.6	6.616	00:02.8	2.20
Myself	Singing	1	0.05959	00:20.3	2.025	00:20.3	0.00
Myself	Playing	3	0.1788	00:54.3	5.397	00:18.1	4.34
Myself	Speaking & Playing	1	0.05959	00:39.1	3.886	00:39.1	0.00
Myself	Singing & Playing	3	0.1788	02:48.5	16.74	00:56.1	12.22
Mother	Speaking	39	2.324	04:21.1	25.94	00:06.6	8.30

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
08:53.8	Comes back on own
16:16.4	Ready to go!

[illegible]

File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 10.htm
Date: Thu Apr 26 2012 14:27:07 GMT-0400 (EDT)

Total Observation Time: 17:17

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	29	1.678	01:22.8	7.991	00:02.8	2.39
Jackson	Vocalization- Laughing	12	0.6941	00:40.1	3.870	00:03.3	0.62
Jackson	Vocalization- Crying/Distressed	2	0.1157	00:48.3	4.661	00:24.1	14.36
Jackson	Away	7	0.4049	01:41.9	9.825	00:14.5	10.28
Jackson	Engaged	7	0.4049	06:02.5	34.95	00:51.7	41.26
Jackson	Engaged/Playing	4	0.2314	06:21.4	36.77	01:35.3	55.01
Myself	Speaking	2	0.1157	00:13.6	1.315	00:06.8	4.75
Myself	Singing	1	0.05785	01:05.5	6.316	01:05.5	0.00
Myself	Playing	4	0.2314	04:23.9	25.45	01:05.9	21.75
Myself	Speaking & Playing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Singing & Playing	3	0.1735	03:21.4	19.42	01:07.1	5.87
Mother	Speaking	27	1.562	04:49.6	27.93	00:10.7	10.31

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
01:58.3	Two tasks, two hands.
11:11.2	All strings
14:23.3	Move my fingers
16:51.6	Ready to go!

Subject: Jackson																
00:00	01:59	02:59	03:59	04:59	05:59	06:59	07:59	08:59	09:59	10:59	11:59	12:59	13:59	14:59	15:59	
Subject: Jackson																
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Subject: Myself																
00:00	01:59	02:59	03:59	04:59	05:59	06:59	07:59	08:59	09:59	10:59	11:59	12:59	13:59	14:59	15:59	
Subject: Myself																
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Subject: Mother																
00:00	01:59	02:59	03:59	04:59	05:59	06:59	07:59	08:59	09:59	10:59	11:59	12:59	13:59	14:59	15:59	
Subject: Mother																
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Subject: NOTE																
00:00	01:59	02:59	03:59	04:59	05:59	06:59	07:59	08:59	09:59	10:59	11:59	12:59	13:59	14:59	15:59	
Subject: NOTE																
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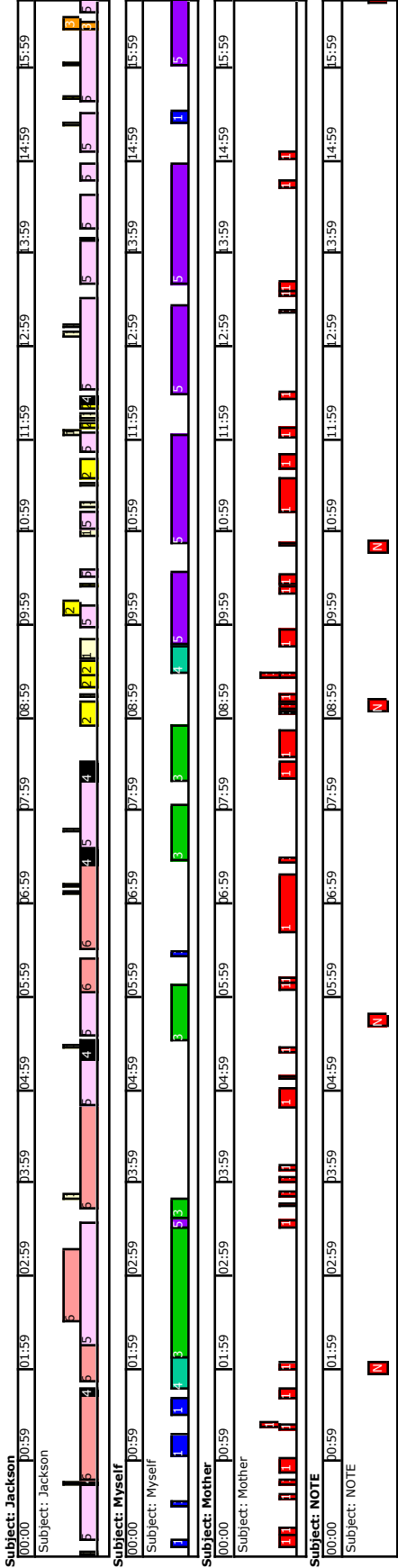
File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 11.htm
Date: Thu Apr 26 2012 14:27:49 GMT-0400 (EDT)

Total Observation Time: 16:59

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	21	1.236	00:50.9	4.996	00:02.4	2.49
Jackson	Vocalization- Laughing	9	0.5297	00:57.6	5.658	00:06.4	4.46
Jackson	Vocalization- Crying/Distressed	2	0.1177	00:11.2	1.105	00:05.6	0.09
Jackson	Away	7	0.4120	00:47.0	4.618	00:06.7	4.51
Jackson	Engaged	16	0.9418	07:37.5	44.89	00:28.5	19.75
Jackson	Engaged/Playing	6	0.3532	04:27.3	26.22	00:44.5	16.62
Myself	Speaking	6	0.3532	00:38.8	3.807	00:06.4	4.28
Myself	Singing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Playing	5	0.2943	03:22.2	19.84	00:40.4	23.31
Myself	Speaking & Playing	2	0.1177	00:37.7	3.704	00:18.8	1.92
Myself	Singing & Playing	6	0.3532	05:10.3	30.44	00:51.7	22.83
Mother	Speaking	42	2.472	04:03.6	23.91	00:05.8	6.28

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
01:57.6	Grabs my hand, takes pick
05:42.2	Plugs ears- speakers
09:05.0	Rhythmic Speech
10:48.4	+ Syllables
16:43.3	Ready to go!



File: file:///Volumes/RED THINGY/Honors Project/Final Project/Scribe Analysis/Session 12.htm
Date: Thu Apr 26 2012 14:28:39 GMT-0400 (EDT)

Total Observation Time: 20:12

Subject	Behavior	Freq.	Rate/Min	Time	% Time	Mean	SDev
Jackson	Vocalization	20	0.9895	01:08.8	5.678	00:03.4	3.87
Jackson	Vocalization- Laughing	15	0.7421	00:47.6	3.933	00:03.1	2.40
Jackson	Vocalization- Crying/Distressed	0	0.000	00:00.0	0.000	00:00.0	0.00
Jackson	Away	0	0.000	00:00.0	0.000	00:00.0	0.00
Jackson	Engaged	14	0.6926	06:08.9	30.42	00:26.3	21.26
Jackson	Engaged/Playing	10	0.4947	03:53.7	19.27	00:23.3	17.10
Myself	Speaking	31	1.534	01:09.0	5.693	00:02.2	2.12
Myself	Singing	2	0.09895	00:51.6	4.258	00:25.8	25.12
Myself	Playing	2	0.09895	00:41.5	3.424	00:20.7	3.16
Myself	Speaking & Playing	0	0.000	00:00.0	0.000	00:00.0	0.00
Myself	Singing & Playing	10	0.4947	06:44.6	33.37	00:40.4	28.51
Mother	Speaking	62	3.067	03:24.6	16.87	00:03.3	3.58

Group	Freq.	Rate/Min	Time	% Time	Mean	SDev
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Start Time	Note
03:30.3	"Yaaa"
06:32.6	"Go"
16:14.8	Rocking to music
17:24.9	"Hi"

[illegible]

Appendix B:
Aggregate Behavior Video Analysis Charts

Table 1
Behavior % of Session Time/Session

	1	2	3	6	8	10	11	12
Subject: Jackson								
Vocalization	5.580	5.437	10.81	5.524	10.22	7.991	4.996	5.678
Vocalization- Laughing	.01041	1.164	4.745	2.393	0.000	3.870	5.658	3.933
Vocalization- Crying/Distressed	11.35	3.522	8.020	3.195	4.541	4.661	1.105	0.000
Away	8.767	15.10	31.71	4.824	9.898	9.825	4.618	0.000
Engaged	38.13	35.58	42.22	31.77	23.25	34.95	44.89	30.42
Engaged/Playing	21.02	7.144	5.476	7.097	26.70	36.77	26.22	19.27
Subject: Myself								
Speaking	0.2850	17.49	2.584	4.578	6.616	1.315	3.807	5.693
Singing	0.000	0.000	0.000	0.000	2.025	6.316	0.000	4.258
Playing	57.84	25.95	20.31	14.45	5.395	25.45	19.84	3.424
Speaking & Playing	0.000	5.546	8.298	1.492	3.886	0.000	3.704	0.000
Singing & Playing	2.378	17.72	20.85	19.12	16.74	19.42	30.44	33.37
Subject: Mother								
Speaking	8.966	23.56	30.05	31.47	25.94	27.93	23.91	16.87

Table 2

[Mean Behavior Time (seconds)/Standard Deviation Behavior Time (seconds)]/Session

	1	2	3	6	8	10	11	12
Subject: Jackson								
Vocalization	3.1/1.97	3.6/2.05	3.3/2.81	3.5/2.95	3.3/2.59	2.8/2.39	2.4/2.49	3.4/3.87
Vocalization-Laughing	1.4/0.3	2.3/0.86	3.0/1.97	3.0/2.28	0.0/0.0	3.3/0.62	6.4/4.46	3.1/2.4
Vocalization-Crying/Distressed	15.9/11.02	5.5/4.4	5.3/3.86	8.9/8.15	22.8/18.32	24.1/14.36	5.6/0.09	0.0/0.0
Away	20.5/20.05	11.1/8.72	33.4/29.27	6.1/4.81	19.9/9.66	14.5/10.28	6.7/4.51	0.0/0.0
Engaged	53.7/83.52	27.8/15.49	28.3/31.39	21.2/11.88	23.4/17.78	51.7/41.26	28.5/17.75	26.3/21.26
Engaged/Playing	36.9/32.73	25.1/13.01	13.4/4.78	33.3/17.62	44.8/28.8	95.3/55.01	44.5/16.62	23.3/17.1
Subject: Myself								
Speaking	1.6/0.8	24.6/15.42	2.7/1.15	3.3/2.54	2.8/2.2	6.8/4.75	6.4/4.28	2.2/2.12
Singing	0.0/0.0	0.0/0.0	0.0/0.0	0.0/0.0	20.3/0.0	65.5/0.0	0.0/0.0	25.8/25.12
Playing	95.8/88.8	45.6/41.34	33.3/14.59	33.9/22.51	18.1/4.34	65.9/21.75	40.4/23.31	20.7/
Speaking & Playing	0.0/0.0	39.0/19.39	61.2/52.33	21.0/0.0	39.1/0.0	0.0/0.0	18.8/1.92	0.0/3.16
Singing & Playing	22.3/6.05	83.0/11.89	34.2/12.8	67.2/9.62	56.1/12.22	67.1/5.87	51.7/22.83	40.4/0.0
Subject: Mother								
Speaking	8.7/8.49	14.4/13.4	8.0/9.58	7.3/14.36	6.6/8.3	10.7/10.31	5.8/6.28	3.3/3.58

Appendix C:
Session Information

Appendix C:

Session #	Date	Location	Session Length
1	2/22/12	Sunshine	47 min
2	3/3/12	YMCA	23 min
3	3/7/12	Sunshine	25 min
4	3/10/12	YMCA	23 min
5	3/14/12	Sunshine	20 min
6	3/17/12	YMCA	23 min
7	3/21/12	Sunshine	24 min
8	4/4/12	Sunshine	17 min
9	4/7/12	Sunshine	20 min
10	4/11/12	Sunshine	17 min
11	4/18/12	Sunshine	17 min
12	4/25/12	Sunshine	20 min

Appendix D:
HSRB Review



BOWLING GREEN STATE UNIVERSITY

Office of Research Compliance

DATE: February 7, 2012

TO: Donovan Thakur

FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: [304977-1] Observational Analysis of the Effects of Music on a Child with Pervasive Developmental Delay

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT RESEARCH

DECISION DATE: February 1, 2012

Thank you for your submission of New Project materials for this project. The Bowling Green State University Human Subjects Review Board has determined this project does not meet the definition of human subject research under the purview of the HSRB according to federal regulations.

We encourage you to continue to confirm with the HSRB whether future projects of this nature require review.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hsrb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.

Comment: Since you plan to video tape the child, you may wish to have the parents sign a "video release" form.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board's records.

Appendix E:
Informed Consent Form

Informed Consent Form

-Introduction/Project Description:

I, Donovan Thakur, and an undergraduate at BGSU, will be conducting music sessions with your child Jackson as part of an honors project, to be completed in accordance with university policy on graduating with university honors. These sessions will involve a variety of musical activities planned by myself and my advisors. Initial sessions will be exploratory in nature and later sessions will be designed to address specific research questions.

-Participation:

Your participation in this study is voluntary and you may choose to withdraw consent to participate in the study at any time, without penalty. For the purposes of this study, the term “you” refers to the parents of the child.

-Benefit:

This project will benefit your child as he explores music. It is intended to inform both you and me about the nature of your child’s relationship to music and it will allow us to make recommendations about your child’s further involvement in music. As a researcher, this project will also increase my experience in working with children with developmental disabilities.

-Location:

The aforementioned music sessions will be conducted at a location agreed upon by the researcher and the participant.

-Duration:

Music sessions will last approx. 20-30 minutes per session and will continue twice a week for 8 consecutive weeks (beginning the week of _____, _____ and ending the week of _____, _____).

-Video Recording:

A video recording of each music session will be taken and analyzed using *Scribe*. The purposes of these recordings and subsequent analysis are to further support and inform the actions of the researcher and his advisors. The recordings will not be made available to the public.

-Compensation:

Both you and I agree that there *will be no compensation* for involvement in the project.

-Expectations:

Any expectations held by the participant will be addressed prior to the start of the project.

-Risk:

The risk involved with the study is no greater than the risk incurred in daily life. As in all research, there may be unforeseen risks to the participant. If an accidental injury occurs, appropriate emergency measures will be taken.

-Contact:

If you have any questions or comments about this study, you may contact Donovan Thakur (419-261-3030, DThakur@falcon.bgsu.edu) or the project advisor, Elaine Colprit (colprit@bgsu.edu). You may also contact the Chair, Human Subjects Review Board, Bowling Green State University, (419-372-7716, hsrb@bgsu.edu), if any problems or concerns arise during the course of the study.

-By signing this document, you acknowledge that you have read the above informed consent form, have been informed of the procedures, risks and benefits of this study, have been informed that your participation in this study is voluntary, have had any questions answered, and agree to participate in the study.

(Participants Signature)

(Date)

(Participants Signature)

(Date)

Appendix F:
Hello/Goodbye Song

HELLO/GOODBYE SONG

AN ADAPTATION OF "LEAN ON ME"

ARR. DONOVON THAKUR

HEL - LO,
GOOD - BYE,

HEL - LO HEL - LO,
SEE YOU NEXT TIME,

HEL - LO HEL - LO,
SEE YOU NEXT TIME,

3 WEL - COME TO MU - SIC. HEL -
WE'LL MAKE MORE MU - SIC. GOOD -

5 LO,
BYE,

HEL - LO HEL - LO,
THATS ALL FOR NOW,

HEL - LO HEL - LO,
SEE YOU NEXT TIME,

7 WEL - COME TO MU - SIC
WE'LL MAKE MORE MU - SIC